Agribusiness & Economics Research Unit
LINCOLN UNIVERSITY

The impacts of changes in agricultural policies in the United Kingdom on trade and agriculture - A literature review

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Chapter 1
Introduction

On June 23, 2016, the United Kingdom (UK) voted narrowly (52:48) to leave the European Union (EU). The UK government then officially notified the EU on March 29, 2017, of its intention to leave, thus triggering Article 50 of the EU Treaty, which specifies that within two years the UK will cease to be a member. However, the date for Brexit is still unclear as the European Union leaders have granted the UK a six-month extension to Brexit until October 31, 2019. Consequently, the nature of the economic relationship between the UK and the remaining EU-27 is still to be defined.

Brexit will change the domestic and trade policies affecting agriculture in the UK and will have important implications for agricultural commodity trade worldwide. These trade policy changes are key factors in determining the consequences of Brexit for agricultural markets in Europe and elsewhere.

Three possible alternatives to EU membership after Brexit are explored in the literature. (1) The Norway Option (i.e. UK remains in the Single Market); (2) the Swiss Option (i.e. bilateral agreements between the UK and EU); or (3) the WTO Option/ No Deal (i.e. UK - EU trade under World Trade Organisation terms). New trade relations will most likely be accompanied by increased trade transaction costs due to the introduction of border checks, tariffs and non-tariff measures. As a consequence of these changes to trade policy, there are likely to be significant factors affecting international agricultural trade which will have implications for the UK, the EU and third-party countries with trading relations with the EU or the UK.

A number of studies have assessed the economic impact of the UK leaving the EU on the UK's economy. In addition, there are a few studies that have assessed the potential effects of the UK exiting the EU on the UK agricultural sector using various scenarios and assumptions (Davis et al., 2017; Bellora et al., 2017; Jongeneel et al., 2016; Van Berkum et al., 2016; Sik Choi et al., 2019). This report will review this existing literature assessing the potential effects of the UK exiting the EU on the UK economy and particularly on the agricultural sector using different scenarios and assumptions.

This report is structured as followed. The next chapter presents descriptions of three possible post-Brexit alternatives for UK-EU relations. Chapter 3 reviews studies that analysed the potential economic impacts of a UK exit from the EU on the UK's economy and trade, respectively. Chapter 4 reviews studies that assessed the potential effects of the UK exiting the EU on the agricultural sector and trade using different scenarios and assumptions. The report finishes with a summary in Chapter 5.

Chapter 2
An Overview of Access Options to the EU

This chapter presents literature that examined the economic impacts of a withdrawal of the United Kingdom (UK) from the European Union (EU). These studies and reports have attempted to quantify the economic impact of Brexit on the UK using different scenarios and assumptions.

Three possible alternatives to EU membership after Brexit are widely cited (Busch & Mattes, 2016). These are:

1. the **Norwegian Option**, i.e. admission to the European Economic Area (EEA);
2. the **Swiss Option**, i.e. bilateral agreements with the EU;
3. the **WTO/ No Deal Option** where the UK's trade relations with the EU would be organised according to the Most-Favoured-Nation (MFN) principle, which applies for all third countries where the EU does not have a preferential trade agreement.

Generally, the WTO Option is considered as the 'pessimistic/hard' scenario for UK-EU post-Brexit relations, while the other two options are considered as 'optimistic/soft' scenarios.

This section starts with the Norwegian and Swiss options that would give some degree of economic integration between the UK and the EU in terms of Brexit, then followed by the WTO/ No deal option that has no integration. However, whilst the Norwegian and Swiss scenarios are considered soft scenarios, this may not be the case for agriculture.

2.1 Norwegian Option/European Economic Area (EEA) membership

Norway is part of the European Economic Area (EEA) but not a member state of the EU. The EEA consists of 31 countries: the 28 EU member states, plus Norway, Iceland and Liechtenstein. The latter three countries are the Member States of European Free Trade Association (EFTA). The three EFTA States and the EU Member States are united by the EEA Agreement[1] (Dhingra & Sampson, 2016).

The EEA Agreement entered into force in 1994, which guarantees Norway, Iceland and Liechtenstein the free movement of persons, goods, services and capitals within the EU's Single Market[2], as well as non-discrimination and equal rules of competition throughout the EEA. This means that Norway participates in the EU Single Market, and it must comply with EU rules regarding the Single Market. However, Norway does not have a vote in deciding the rules of the Single Market (Dhingra & Sampson, 2016).

[1] Switzerland is also an EFTA state, however, it is not covered by the EEA Agreement. Switzerland has a separate bilateral free trade agreement with the EU, which is discussed in Section 3.3 Swiss Option.
[2] The Single Market refers to the EU as one territory without any internal borders or other regulatory obstacles to the four free movements (EC, 2017b).

The EEA Agreement does not cover the common agriculture and fisheries policies, however it contains provisions on trade in agricultural and fish products. Other EU policies not included are the common trade policy; common foreign and security policy; justice and home affairs (the EEA/EFTA States are however part of the Schengen area); direct and indirect taxation; or economic and monetary union (EFTA, 2019).

In addition, the EEA Agreement does not cover the EU Customs Union[3]. This means that Norway can set its own external tariff and negotiate its own trade deals with countries outside the EU (Dhingra & Sampson, 2016).

The EEA members effectively contribute to the EU budget to be part of the Single Market. Norway make its financial contribution to the EU budget through the EEA and Norway Grant scheme. From the period 2014 to 2020, Norway's average annual commitment to the EU was 447 million Euro (Dhingra & Sampson, 2016) which is 83 per cent of the UK's payment to the EU on a per capita basis (House of Commons, 2013). The UK's population is approximately twelve times larger than that of Norway. Thus, the UK could expect to continue contributing substantially to the EU's budget after Brexit under the Norwegian Option (Dhingra & Sampson, 2016).

If the UK choses the Norwegian Option, the EEA Agreement would give the UK the most access to the EU's Single Market (see Table 2.1). The UK would maintain the Single Market regulations as well as social and employment regulations of the EU. However, the UK would be a rule-taker, which means that it would have less say in shaping its rules than it does now as an EU member (Dhingra & Sampson, 2016).

Other downsides to joining the EEA might be that UK exporters' trade cost would increase due to the UK leaving the EU Customs Union. It has to comply with customs and rules of origins. Exports from Norway to the EU do not need regulatory checks, however, Norwegian exporters need to meet "rules of origin" requirements to benefit from preferential treatments. Under the Norwegian Option, the UK exporters would face increased trade transaction costs because of customs checks (Dhingra & Sampson, 2016).

[3] A Customs Union is a form of trade agreement. In a Customs Union, tariffs are eliminated between the states that form the Customs Union. Moreover, the participating states agree to apply a common external tariff to the goods imported into the Union from non-participating states. The EU is a Free Trade Area, as well a Customs Union.

Table 2.1: The relationship between Norway and the EU especially under the EEA.

Included under EEA agreement	Not included in EEA
Goods: Some agricultural and fisheries products; Energy; Competition and state aid; Trade facilitation and technical cooperation.	Common Agricultural Policy (CAP) Fisheries policy Regional policy External trade policy Foreign policy
Services: Financial services; Transport Postal services; Electronic communication, audio-visual services and information society	
Capital Persons: Free movement of persons; Social security; Recognition of professional qualifications. **Flanking and horizontal' policies:** Consumer protection; Cultural Affairs; Education, training and youth; Research and innovation; Public health; Enterprise policy; Civil protection; Health and safety at work and labour law; Environment; Employment and social policy; company law; Budgetary matters; Gender equality, antidiscrimination and family policy	

Source: Adapted from EFTA[4] and Booth et al. (2015).

Norway has a heavily protected agricultural sector and has limited access to the EU's agricultural sector. However, the EEA incorporates an agreement of trade in processed agricultural products (Protocol 3) and trade of basic agricultural products (Article 19). Protocol 3 regulates trade in processed agricultural products such as pizza and yogurt. Products included are subject to the general provisions of the EEA Agreement on the free movement of goods. In addition, Article 19 of the EEA entered into force between the EU and Norway on the 1st January 2012. Article 19 specifies that Norway and the EU should be committed to gradually liberalise trade in agricultural products. For Norway, Article 19 means an increase in the tariff-free export of cheese to the EU, as well as tariff-free quotas for a number of agricultural products, including berries, various snacks, dog and cat food, cod liver oil and Christmas trees. In particular, since 2016, Norway has had an agreement with the EU for a tariff free quota of 4,500 tonnes of cheese. For the EU, Article 19 increases the tariff-free import quota for cheese and various meat products, as well as certain inputs for the food preservation and feed industries. Norway does not always fill the available export quotas, whereas the EU generally does (Ministry of Foreign Affairs, 2015).

Under the Norwegian Option, the UK would reintroduce tariffs for its agricultural imports from the EU. The WTO tariffs would apply to third country imports. The UK could negotiate a trade agreement with the EU relating to agricultural products, as well as negotiate trade agreements with third countries.

[4] EFTA, 'European Economic Area: policy areas", accessed August 2018; http://www.efta.int/EEA/Policy-Areas-2422

2.2 Swiss Option

Switzerland is neither an EU member nor part of the EEA Agreement, but it has a number of sectoral bilateral agreements with the EU. Switzerland and the EU signed Bilateral Agreement in 1999; this includes free movement of persons, some agricultural trade, technical barriers to trade, government procurement, land transport, air transport and research. Bilateral I entered into force in 2002, and gradually removed tariffs on trade in primary agricultural products. Bilateral Agreement II between Switzerland and the EU was signed in 2004. It covers the Schengen[5]/Dublin[6] agreements, processed agricultural products, interest and taxation, antifraud, the environment, statistics, film promotion and pensions. Bilateral Agreements I and II allow Switzerland to access part of the EU's Single Market. Switzerland has achieved a similar level of goods market integration with the EU as EEA countries through its EFTA membership and the bilateral agreements (Dhingra & Sampson, 2017).

Switzerland has a highly protected agricultural sector. With regards to agricultural trade, the EU and Switzerland have two sectoral trade agreements regulating trade in agri-food products. The EU-Switzerland Agricultural Agreement (also named Agreement between the European Community and the Swiss Confederation on trade in agricultural products), is one of the seven sectoral agreements under Bilateral I covering primary agricultural products since 2002. Under this agreement, tariffs are reduced on fruits and vegetables, horticulture, meat and wine. In particular, trade in cheese between Switzerland and the EU has been completely liberalised since 2007. The agreement also reduces or eliminates non-tariff barriers (NTBs) arising due to regulatory differences. For example, regulations in the areas of plant health, animal feed, seeds, organic farming, wine, fruit and vegetable have been mutually recognised as being equivalent between the EU and Switzerland (Schweizerische Eidgenossenschaft, 2016; Copenhagen Economics, 2016).

The Agreement on Processed Agricultural Products under Bilateral II liberalises a large amount of trade in processed agri-food products between the EU and Switzerland since 2005. The EU has no customs duties on a range of agri-food products imported from Switzerland such as chocolate and biscuits. In return, Switzerland reduces customs duties on some imports from the EU (Schweizerische Eidgenossenschaft, 2016).

Switzerland has limited market access in the Single Market with regard to the free movement of services (see Table 2.2). The EU and Switzerland have not reached a comprehensive trade agreement covering services. If the UK adopted the Swiss Option post-Brexit, the UK would need to negotiate a broader service agreement with the EU focusing on financial and business services.

[5] The Schengen Association Agreement facilitates both travel between Switzerland and the EU, by lifting checks on people at the internal borders, and improves international justice and policy cooperation in the fight against crime (European Commission, 2018).

[6] The Dublin Association Agreement ensures that an asylum application is only examined by one state within the Dublin Area. The Dublin Area includes all EU Member States. The Dublin criteria establish which state is responsible for dealing with an application. They prevent asylum seekers from being sent from one country to another and, when their first application for asylum has been denied, from submitting a new one in another country of the Dublin area (Schweizerische Eidgenossenschaft, 2018).

Similar to Norway, Switzerland accepts most EU economic regulations and has very limited influence over the planning or shaping of the EU rules which it complies with. Like the EEA countries, Switzerland makes payment to the EU budget to cover the programmes it participates in.

If the UK adopted the Swiss Option, there would be less economic integration between the UK and the EU than with the EEA membership and the UK would have to follow EU rules to participate in the Single Market (Dhingra & Sampson, 2016).

Another disadvantage of the Swiss Option would be that the UK would leave the Customs Union, as a consequence UK exporters would face increased trade transaction costs due to customs checks. In addition, the UK would have to comply with customs and rules of origins when trading with the EU (Dhingra & Sampson, 2016).

Busch & Matthes (2016) noted that the Swiss Option is unpopular in the EU, as the Bilateral Agreements between the EU and Switzerland were initially negotiated as an interim solution before EU-accession of Switzerland. Thus, it would be a question that whether the EU is willing to accept a similar relationship with the UK.

Table 2.2: The relationship between Switzerland and the EU.

Included in Swiss FTA and bilateral/Swiss access to EU markets	Not included in EU deals
Goods: No import, export duties or quotas for industrial products; Some agricultural products (processed food); Trade facilitation and technical cooperation.	Cross-border financial services Energy and climate policy Social and employment policy Consumer rights CAP Fisheries policy Regional policy External trade policy Foreign policy
Services: Limited cross-border provision of services for a maximum of 90 days per year under the terms of the free movement of persons agreement (excluding employment agencies and financial services)	
Capital: Non-life insurers have the freedom to establish operations in one another's territory	
Persons: Free movement of persons: Social security; Recognition of professional qualifications	
Other areas: Public procurement; Research; Overland transport; Air transport; Member of Schengen border-free area; Participants in 'Dublin system' for asylum claims; Taxation of savings; Fight against fraud; MEDIA programme.	
"Cooperation agreements": Membership of European Environment agency and EUROSTAT; education, vocational training and youth; Cooperation with Eurojust and Europol; Cooperation between competition authorities; European Asylum Support Office	

Source: Adapted from Schweizerische Eidgenossenschaft (2016) and Booth et al. (2015).

2.3 World Trade Organisation (WTO) Option/ Most Favoured Nation Principle

The WTO Option is also often called the No-Deal Option. It refers to the case if the UK does not reach a trade agreement with the EU by 31st October 2019, then by default, the UK will have to comply with the WTO rules of trade with the EU and third countries, including countries that currently have trade deals with the EU.

Since 2016 the WTO has 164 members comprising all major and most minor economies. The WTO rules require each member must grant the same "most-favoured-nation" (MFN)[7] market access, which means charging the same tariffs, to all other WTO members (except countries that chose to enter into free trade agreements, such as the EU, EEA or EFTA, and they can give preferential market access to developing countries) (see Table 2.3) (WTO, 2018).

Under the WTO Option the UK would lose its tariff-free market access to the EU Single Market and default to the WTO tariffs for all imports. Clearly, the imposition of tariffs on EU-UK trade would increase trade costs for both importers and exporters (Dhingra et al. 2017). These increases can be divided into three parts: (1) higher tariffs on imports; (2) higher non-tariff barriers (NTBs) to trade (arising from different regulations, border controls, etc.); and (3) the UK will not participate in future steps that the EU takes towards deeper integration and the further reduction of non-tariff barriers within the EU (Dhingra et al., 2016).

The UK's trade in services would also have to comply with the WTO rules, including the General Agreement on Trade in Services (GATS), and the Trade in Services Agreement (TISA). Booth et al. (2015) noted that the EU's Single Market for trade in services is more liberalised than the WTO. This implies that the WTO membership would reduce access to EU markets for UK service producers. One of the advantages of WTO Option might be that the UK would stop making financial contribution to the EU budget.

With regards to agricultural trade policy, under the WTO Option, the UK would no longer be subject to the EU CAP. This would remove the current level of subsides and the support that the agricultural sector receives under the CAP. These would be replaced by UK agricultural policy. UK- EU agricultural trade would be subject to tariffs for agricultural products under the WTO Agreement on Agriculture. Also, the UK's approach to agricultural subsidies would come under WTO scrutiny (Swinbank, 2017).

As mentioned above, under the WTO Option, import tariffs and various controls would be imposed on trade between the UK and the EU, with impacts concentrated on agriculture and other industries that depend on products that repeatedly cross between the UK and the rest of the EU. The average import duty for agricultural goods that the EU (and, for now, the UK) charges is 8.7 per cent, however duties exceed 25 per cent for more than one in ten agricultural products. The highest tariff rates are in fact way above 25 per cent — the equivalent of 189 per cent for some dairy products and 116 per cent for some animal products. For processed food, the tariff rates are very complex, for example they could already change by reducing the sugar content in a product. Those rates do not apply to imports under free trade agreements or preferences for developing countries (the Generalised Scheme of

[7] MFN treatment requires the WTO members to accord the most favourable tariff and regulatory treatment given to the product of any one Member at the time of import or export of similar products to all other Members.

Preferences (GSP)), but under the 'no deal scenario' they would have to apply to trade between the UK and the EU. Hence, under the WTO Option the impact on agri-food trade would likely be significant (Ungphakorn, 2017).

In addition, the EU and the UK would have to determine their respective shares of the EU's tariff rate quotas (TRQs). TRQs are important in respect to the agricultural sector, as it is where each WTO member's TRQs allow certain quantities of agricultural products to enter the market duty-free or at a rate below the bound rate. Downes (2017) has emphasised that "splitting" TRQs between the EU and the remaining EU27 is challenging. This is because the EU's reallocation of the TRQs would be open to negotiation by the WTO members.

A particular example is the country specific quota for NZ lamb imports into the EU which is currently set at 230,000 tonnes. Inside this quota, imports are duty free. However, outside this quota, a mixed tariff is charged which is up to 12.8 per cent of the price, plus up to €902 - €3,118 per tonne. The UK and the EU have jointly proposed to the WTO that their quotas should be split in a way that keeps the same total. The UK and EU requested that the share each country gets should be in proportion to the percentages of averages of 2013-15 EU trade data. For NZ lamb, this resulted in a 50:50 split - about 115,000 tonnes in each quota. However, NZ and a number of other countries have complained about this method as it weakens the trading rights they negotiated in the WTO because it reduces the commercial value of the quota. Also, partitioning the quotas in the proposed way would limit the flexibility of exporting countries to choose between exporting to the UK or another EU country where it might be more profitable. While the UK is a member of the EU, NZ can choose to export to any EU country where the prices are more profitable (Ungphakorn, 2017).

Table 2.3: A Summary of the WTO Option.

Included/Access to EU markets	Not included
Goods: MFN treatment	• Free movement of people • Cross-border financial services • Social and employment policy • Energy and climate policy • Consumer rights • Agricultural policy • Fisheries policy • Regional policy • External trade policy • Foreign policy
Services: Under the GATS, UK companies selling services through subsidiaries should not be discriminated against.	
Capital: The TRIMs (Trade Related Investment Measures) is designed to avoid trade distorting effects of investments in the goods trade. The OECD's "Code of liberalisation of Capital Movements" includes legally binding rule on non-discrimination on capital flows.	
People: The Uruguay trade round added liberalising measures on intra-company transferees regarded as "essential personnel" and business visitors.	
Other: Agreement on Government Procurement - a plurilateral deal on opening up of government procurement market	

Source: Booth et al., (2015).

A summary of the three alternatives for the UK after leaving the EU and their potential consequences are presented in Table 2.4. Overall, the Norway and Swiss Options would give the UK certain level of preferential market access to the EU Single Market. However, the UK would face a greater level of EU regulations under the Norway and Swiss Options. Under the WTO Option, the UK would regain full regulatory sovereignty while it would trade with the EU under the WTO rules. However, the table below excluded the impact on agriculture so whilst the Norwegian and Swiss options allow more access to the EU this is not necessarily the case for agriculture.

Table 2.4: Possible alternatives to EU membership and their consequences for the UK.

		Norway/EEA	**Switzerland**	**WTO**
Decision-making rights and representation in the EU		No	No	No
Customs Union		No	No	No
Tariffs on the UK exports to the EU		No	No	Yes
Single Market	Free movement of goods	Yes	Partial	No
	Free movement of persons	Yes	No	No
	Free movement of capital	Yes	No	No
	Free movement of services	Yes	Partial	No, GATS Rules
Renegotiation of FTAs		Yes	Yes	Yes
Increased trade costs due to RoO		Yes	Yes	Yes
Cost of customs clearance		Yes	Yes	No
Regulatory autonomy		Limited	Limited	Yes
Influence on EU Regulation		Very limited	No	No
Financial Contributions		Yes, partial	Yes, partial	No

Source: Busch & Matthes, (2016).

In the following two chapters studies and reports are presented that analyse the impact of different exit scenarios and assumptions on the UK's economy and trade (Chapter 3) and especially on the agricultural sector (Chapter 4).

Chapter 3
Effects of Brexit on the UK's Economy and Trade

This chapter presents the literature that examined the economic impacts of a withdrawal of the United Kingdom (UK) from the European Union (EU). These studies and reports have attempted to quantify the economic impact of a Brexit on the UK using different scenarios and assumptions.

Various studies have been conducted to estimate the economic impact of the UK leaving the EU on the UK's economy with the majority of studies projecting a significant impact on the UK's economy from Brexit. The HM Treasury (2016) estimated the long-term economic impact of Brexit on the UK's economic growth by 2030 using a gravity modelling approach. Three different scenarios were modelled (1) the EEA membership (Norway Option); (2) a negotiated bilateral agreement (FTA/Swiss Option); and (3) WTO membership (WTO Option). Results showed that leaving the EU under all three options would have different degrees of negative impact on the UK's economy by 2030 (see Table 3.1). Among the three options, the WTO membership would be the alternative with the most long-term negative impact on the UK's economy. The findings showed that relying on WTO rules would result in a significant reduction in the UK's GDP by 2030 (decrease between 5.4 per cent and 9.5 per cent). This is equivalent to a loss of £5,200 per annum per UK household over the long-term. In comparison, under the EEA membership Option, the total loss was estimated between 3.4 per cent and 4.3 per cent of GDP by 2030. This loss of GDP is equivalent to £1,100 less per year for each household. The HM Treasury (2016) noted leaving the EU to join the EEA would maintain substantial access to the EU Single Market. However, the introduction of customs borders with the EU would increase trade transaction costs.

Under the FTA Option (Swiss Option), the HM Treasury (2016) predicted that the UK's GDP would fall between 4.6 per cent and 7.8 per cent by 2030. This is equivalent to a loss of £1,100 per year for each household. The HM Treasury (2016) suggested that the FTA Option provides less access to the Single Market when compared to the EEA membership Option.

Table 3.1: Annual impact of Brexit on the UK in 2030.

	EEA Scenario	FTA Scenario	WTO Scenario
GDP level (%)- central	-3.8	-6.2	-7.5
GDP level (%)	-3.4 to -4.3	-4.6 to -7.8	-5.4 to -9.5
GDP per capita - central	-£1,100	-£1,800	-£2,100
GDP per capita	-£1,000 to -£1,200	-£1,300 to -£2,200	-£1,500 to –£2,700
GDP per household -central	-£2,600	-£4,300	-£5,200
GDP per household	-£2,400 to -£2,900	-£3,200 to -£5,400	-£3,700 to -£6,600
Net impact on receipts	-£20 billion	-£36 billion	-£45 billion

Source: HM Treasury, (2016).

Overall, the HM Treasury (2016) concluded that their economic analysis showed that all options increased the economic costs for the UK. The UK would have to negotiate new trade agreements with the EU to have preferential access to the Single Market. The analysis further showed that in all options trade transaction costs were increased between the UK and the EU. Combined, the reduced access to the Single Market and increased trade transaction costs would potentially make the UK a less attractive destination for foreign investment. Lastly, with all options the UK would not be able to benefit from the EU's FTAs with third countries. Hence, the UK's access to global markets might be reduced as the UK would have to renegotiate FTAs with third countries (HM Treasury, 2016).

In their study, PwC (2016) applied a computable general equilibrium (CGE) model to analyse the potential economic impacts of leaving the EU on the UK in 2020, 2025 and 2030, respectively. Two scenarios were analysed; these were (1) FTA scenario, i.e. the UK exits and negotiates a free trade agreement with the EU, based on tariff-free trade in goods (but not services). The UK would have to implement EU standards on goods supplied to the EU, but otherwise would not be bound by the four freedoms of the Single Market; and (2) WTO scenario, where no agreement is made and the UK trades at WTO tariff levels. Results are shown in Table 3.2. It can be seen that by 2020, the UK GDP would drop by 0.3 per cent in the FTA scenario and by 5.5 per cent in the WTO scenario. In 2030, UK GDP would decrease by 1.2 per cent in the FTA scenario and by 3.5 per cent in the WTO scenario. With regards to trade impacts, the study showed that trade between the UK and the EU in 2020 would drop by 0.5 per cent and 1.7 per cent in the FTA and WTO scenarios, respectively, compared to the UK remaining a member of the EU. The UK's trade with the EU would decrease by 2.1 per cent in the WTO scenario in 2030.

Table 3.2: Results of the PwC study (percentage change).

	FTA scenario			WTO scenario		
	2020	**2025**	**2030**	**2020**	**2025**	**2030**
Trade	–0.5	–0.5	–0.5	-1.7	-1.9	-2.1
Total impact on GDP	-0.31	-1.1	-1.2	-5.5	-4.1	-3.5
Impact on GDP per Capita	-3	-0.9	-0.8	-5.4	-3.6	-2.7

Source: PwC, (2016).

In a similar study, Booth et al. (2015) assessed the economic impact of the UK leaving the EU on the UK's economy using a computable general equilibrium (CGE) model. The authors simulated four possible scenarios for the UK-EU relations after Brexit in 2030. These scenarios were (1) WTO scenario; (2) FTA 1: comprehensive FTA between EU and UK; (3) FTA 2: UK – EU FTA and Unilateral Free Trade with the rest of the world; (4) UK - EU FTA no financial contribution to EU budget, deregulation of UK economy and opening up almost fully to trade with the rest of the world. Table 3.3 shows that in the WTO scenario in 2030 UK GDP would decrease by 2.2 per cent which equals to a welfare loss of £55.52 billion. In the FTA 1 scenario, UK GDP was estimated to drop by 0.8 per cent by 2030. In contrast, in the FTA 2 scenario UK GDP would increase 0.6 per cent by 2030 and even further by 1.6 per cent in the fourth scenario UK - EU FTA (4) (Booth et al., 2015).

Table 3.3: Impacts on UK of Brexit on Real GDP and Welfare.

	Worst case Brexit: WTO scenario		UK-EU FTA (1)		UK-EU FTA (2)		Brexit best case: UK-EU FTA	
	%GDP	£bn	%GDP	£bn	%GDP	£bn	%GDP	£bn
Total welfare gain/ loss	-2.23	-55.52	-0.81	-22.12	0.64	8.78	1.55	34.78

Source: Booth et al., (2015).

In their study, Dhingra et al. (2017) used a general equilibrium trade model to examine the economic costs and benefits of Brexit under two scenarios: (1) a 'soft Brexit' (the Norway Option) and (2) a 'hard Brexit' (the WTO Option). Results on welfare effects showed that leaving the EU would reduce the welfare of British citizens in both scenarios. As shown in Table 3.4, the total welfare change in the 'soft Brexit' scenario was estimated at -1.3 per cent (which equals a loss of -£25.1 bn in GDP or -£893 income loss per household) and at -2.7 per cent (which equals -£49.8bn in GDP or -£1,773 income loss per household) in the 'hard Brexit' scenario.

Table 3.4: Impact of Brexit on living standards in different regions.

	Soft Brexit		Hard Brexit	
	Change in % welfare	**Change in GDP (£bn)**	**Change in % welfare**	**Change in GDP (£bn)**
UK	-1.34	-25.1	-2.66	-49.8
All EU countries except UK	-0.14	-12.3	-0.35	
Non-EU countries	0.01	3.7	0.02	7.4

Source: Dhingra et al., (2017).

Table 3.5: Change in UK trade flows after Brexit.

Scenario	Horizon	Total UK Exports (%)	Total UK Imports (%)	Exports to EU (%)	Imports from EU (%)
Soft Brexit scenario	Short run	-5	-6	-14	-13
	Long run	-9	-8	-25	-22
Hard Brexit scenario	Short run	-14	-14	-36	-34
	Long run	-16	-16	-43	-38

Source: Dhingra et al., (2017).

With regards to UK trade flows after Brexit (see Table 3.5), Dhingra et al. (2017) found that in the 'soft Brexit' scenario, total UK exports would decrease by 5 per cent in the short run (1 year after Brexit) and by 9 per cent in long run (10 years after Brexit). Moreover, UK exports to the EU would fall by 14 per cent in the short run, and by 25 per cent in the long run. In the 'hard Brexit' scenario, total UK exports were projected to fall 14 per cent and 16 per cent in the short run and long run, respectively.

The UK's exports to the EU would drop by 36 per cent in the short run, and 43 per cent in the long run, respectively.

Dhingra et al. (2017) concluded that the economic consequences of Brexit will depend on the future of UK-EU trade relations. However, the results of two alternatives showed that leaving the EU would lower UK – EU trade because of reduced integration with EU countries.

Finally, Table 3.4 shows also that countries outside the EU may gain from Brexit, although the numbers are very close to zero. This is because of trade diversion effects due to the fact that the UK partially switches from trading with the EU to trading with non-EU countries (which in turn benefit from more trade with the UK) (Dhingra et al., 2017).

In another study, Figus et al. (2018) used a computable general equilibrium (CGE) model to examine the long-term economic impact of Brexit on Scotland and the rest of UK (RUK). The authors considered the FTA and the WTO scenarios for UK-EU interactions post-Brexit. Results showed a substantial reduction in trade between Scotland and the EU for goods and services under both FTA and WTO scenarios. In the WTO scenario, total export prices were projected to decrease by 0.6 per cent in the short run, 3.2 per cent after 5 years, 6.7 per cent after 10 years and 8.3 per cent in long run. Scottish export prices of goods to the EU were projected to fall 5.1 per cent in the short run, 25.7 per cent after 5 years, 50.5 per cent in 10 years and 51.8 per cent in the long run. Figus et al. (2018) pointed out the reduction in export prices is obviously due to the imposition of the tariff on Scottish goods exported to the EU.

In terms of the results under the FTA scenario, Figus et al. (2018) reported that the total export prices would drop by 0.2 per cent in short run and 6.1 per cent in long run. Scottish export prices of goods to the EU were projected to decrease by 4.1 per cent in short run, 39.3 per cent in long run. In addition, the import prices of goods from the EU were projected to drop by 5.2 per cent and 37.3 per cent in short run and long run.

In their study, Boulanger & Philippidis (2015) used a computable general equilibrium (CGE) model to model scenarios with the assumptions of nationalisation of the UK's payments to the EU, a free trade agreement with the EU and adoption of the existing EU external tariff on non-EU trade. Under the UK-EU FTA scenario, model projections indicated a small real income gain for the UK (i.e. 0.6 per cent of per capita GDP) which is generated by increases in (tariffed) imports of non-EU origin. However, this would turn into a loss of 0.7 per cent of UK per capita real income under conditions of higher assumed trade transaction costs arising from the loss of Single Market access.

In their study, Mion & Ponattu (2019) assessed the economic impact of Brexit on European countries and regions using a general equilibrium trade model. In two different scenarios – a soft and hard Brexit - Mion & Ponattu (2019) examined impacts on productivity, markups, product variety, welfare and the distribution of population across European countries and regions. Results showed that Brexit in general – hard or soft – was projected to have a significant, but regionally varying, impact on welfare. The UK was projected to experience the most significant impact from the UK leaving the EU. Aggregate welfare losses in the hard Brexit scenario were projected to amount to 57 billion Euros annually (-873 Euros per capita). In a soft Brexit scenario, the aggregate welfare loss was projected to amount to 32 billion Euros for the UK (-500 Euros per capita). With regards to the other countries, the welfare losses were stronger the closer a country is to the UK as shown in Table 3.6 (Mion & Ponattu, 2019).

Table 3.6: Welfare income loss in selected European Countries.

Income Loss		*in billion Euros*	
		Soft Brexit	Hard Brexit
1	Great Britain	32.26	57.34
2	Germany	5.27	9.5
3	France	4.29	7.73
4	Italy	2.28	4.12
5	Ireland	1.87	3.41
6	Netherlands	1.75	3.16
7	Spain	1.73	3.12
8	Belgium	0.94	1.69
9	Sweden	0.79	1.43
10	Switzerland	0.74	1.34

Source: Mion & Ponattu, (2019).

To conclude, a large number of studies have been conducted to estimate the economic impact of the UK leaving the EU on the UK's economy. The majority of these projected a negative impact on the UK's economy from Brexit with a projected reduction of GDP and loss in household income with amounts varying between different scenarios. The exception being when it is assumed the UK can cease payments to the EU and yet continue tariff free access and current tariff levels with the rest of the world, a rather unrealistic scenario. The studies further showed that these welfare impacts vary regionally with welfare losses predicted to be stronger the closer a country is to the UK.

Chapter 4
Impacts of Brexit on Agriculture and Trade in the UK and Elsewhere

A few studies have assessed the potential effects of the UK exiting the EU on agriculture and trade using different scenarios and assumptions. In their study, Davis et al. (2017) analysed the impact of three different Brexit trade scenarios on seven UK agricultural commodities (beef, sheep, pigs, poultry, milk & dairy, wheat and barley) using a partial equilibrium modelling framework: the FAPRI-UK model[8] in combination with the FAPRI-EU model (GOLD)[9]. The scenarios were (1) Bespoke Free Trade Agreement with the EU; (2) WTO Default; and (3) Unilateral Trade Liberalisation. Results from each scenario were compared to the baseline in 2025 that assumed that the UK remains in the EU. Table 4.1 outlines the three trade scenarios in more detail. In addition, the MFN tariffs applied in WTO default scenario are presented in Table 1.1 of the Appendix. Further, the authors assumed that the UK inherits the EU's tariff structure to third countries in terms of exports from the UK to the rest of the world. In addition, TRQs applied by the UK from third countries are retained. TRQs for the UK are calculated based on the average level of imports from the rest of world in the last five years.

Table 4.1: Trade scenario definitions.

Bespoke Free Trade Agreement with the EU (Scenario 1)	WTO Default (Scenario 2)	Unilateral Trade Liberalisation (Scenario 3)
• UK retains tariff and quota free access to the EU and EU retains tariff and quota free access to the UK • UK maintains EU tariff structure to rest of the world • 5% trade facilitation costs on UK-EU27 trade	• MFN tariffs applied to imports from the EU • TRQs from third countries retained • MFN tariffs applied to UK exports destined for the EU • No changes in tariff structure for exports to the rest of the world • 8% trade facilitation costs on UK-EU27 trade	• Zero tariffs applied on imports to the UK from both the EU and the rest of the world • MFN tariffs applied to the UK exports destined for the EU • No change in tariff structure for exports to the rest of the world • 8% trade facilitation costs on UK-EU27 trade

Source: Davis et al., (2017).

Overall, the authors estimated that the changes to product prices, production and trade were relatively smaller in the FTA scenario, than in the WTO default scenario and in the Unilateral Trade Liberalisation scenario (see Table 1.2 to 1.4 in the Appendix). The imposition of MFN tariffs in the WTO default

[8] This model was developed by Agri-Food and Biosciences Institute (AFBI-Economics).
[9] This model is run by Food and Agricultural Policy Research Institute (FAPRI) at the University of Missouri.

scenario would lead to significant adjustments in trade between the UK and the remaining EU countries. In turn, these changes in trade would have a significant impact on the domestic market, prices of all commodities were projected to decline in the unilateral trade liberalisation scenario. Davis et al. (2017) suggested that domestic productivity and competitiveness under the trade liberalisation scenario would have to be improved urgently, as producers would be much more exposed to direct competition with international suppliers.

In more detail, results showed that in the Bespoke FTA scenario commodity prices were projected to increase due to the higher trade transaction costs. As shown in Table 1.2 to 1.4 in the Appendix, UK prices were projected to grow for commodities in which the UK is a net importer, such as beef (+3 per cent) and cheese (+1 per cent). In contrast, UK prices were projected to drop for commodities in which the UK is a net exporter, such as barley (-1 per cent) and sheepmeat (-1 per cent).

In the WTO default scenario, results showed that the impact of Brexit on the selected commodities varied by sector. In the UK beef sector, the implementation of high MFN tariffs on beef products had significant impact on beef trade flows between the UK and the remaining EU countries. As a result, the UK beef price was projected to increase by 17 per cent by 2025. Similarly, prices for pigmeat and poultry were projected to increase by 18 per cent and 15 per cent, respectively. Similarly, results for dairy commodities showed that UK cheese and butter prices were projected to increase by 29 per cent and 43 per cent, respectively compared to the baseline in 2025. In contrast, sheepmeat prices were projected to decrease by 18 per cent by 2025 (Davis, et al, 2017).

With regards to trade, Davis et al. (2017) found that in the WTO scenario UK crop exports to the EU were projected to fall by 2025, with wheat exports projected to collapse entirely and barley exports falling by 80 per cent. Also, UK cheese imports from the EU were projected to fall significantly, while butter imports from the EU were projected to collapse completely.

Under the Unilateral Trade Liberalisation scenario, Davis et al. (2017) indicated that the elimination of tariff barriers would have an overall negative impact on UK prices across all commodities. Producer prices were projected to fall significantly in beef (-45 per cent) and sheep (-29 per cent), and more moderately in pigs (-12 per cent), milk & dairy (-10 per cent), poultry (-9 per cent), barley (-7 per cent) and wheat (-5 per cent).

Bellora et al. (2017) applied the MIRAGE model[10] to estimate the impact of Brexit on the EU-UK agricultural trade. In their study, the impacts of three different WTO trade scenarios on 19 agri-food industries, 14 manufacturing sectors, 8 services sectors and 35 geographical areas were modelled. The scenarios were (1) the WTO scenario", which applies WTO rules for EU-UK trade, as well as trade between the UK and non-EU countries. In this scenario, Bellora et al. (2017) assumed that tariffs and non-tariff-measures (NTMs) would be imposed on bilateral agricultural trade between the UK and the EU, and between the UK and Turkey. (2) WTO (Tariff Only) scenario which uses bilateral tariffs up to MFN level between the UK and EU, no NTMs; (3) WTO (Ireland NTM) scenario which assumed that Ireland would face higher Ad Valorem Equivalent (AVE) for NTMs when trading with the EU after Brexit. Tariff and NTM shocks were introduced in 2021 and projected out to 2030.

[10] The MIRAGE model is a recursive-dynamic computable general equilibrium model designed for trade policy analysis (Bellora, et al. 2017). A detailed description of the model in http://www.mirage-model.eu.

Results showed that there was a large decrease in EU27-UK agri-good trade flows in the WTO scenario. In this scenario, European agri-food exports to the UK were projected to decrease by 62 per cent. Some agri-food exports from the EU to the UK, such as rice, white meat, sugar, dairy and red meat were projected to almost completely collapse, falling by over 90 per cent by 2030. In contrast, in the WTO Tariff only scenario, Bellora et al. (2017) found that the impacts of Brexit on the EU27-UK agri-food products were almost halved with the exception of red meat (and sugar and dairy products to a smaller extent). For those sectors, the WTO tariff only scenario was projected to have almost the same impact than the WTO scenario. The authors explained that for these sectors protection comes mainly from the MFN tariff, not from NTMs. Results further showed that direct impacts on European agri-food exports to UK were offset by increased exports to all other trading partners.

With regards to EU sub-regions, Bellora et al. (2017) identified that Ireland, the Netherlands and France were projected to lose the most in terms of trade by volume among the EU states. For example, results showed that Ireland's exports to the UK were projected to decrease 70 per cent by volume. Exports from the Netherlands and France to the UK were projected to fall by 66 per cent and 51 per cent by volume, respectively. Bellora et al. (2017) pointed out that the significant decrease in these countries was due to these countries having large volumes of exports to the UK.

The study concluded that for the majority of sectors, the impact of NTMs is nearly twice that of the tariffs and hence drives the impacts on trade, with the exception of red meat, sugar and dairy. Therefore, the implementation of MFN tariffs on trade between the UK and the EU27 would have a negative impact on bilateral trade between the two countries. In addition, the increase in both NTMs and tariffs would have stronger impacts on bilateral trade between the UK and the EU27 compared to only increasing tariffs (Bellora et al., 2017).

In their study, Jongeneel et al. (2016) used the partial equilibrium model - AGMEMOD model, to analyse the impact of Brexit on British agriculture and the food sector. Nine agricultural products were selected in their study: soft wheat, barley, oilseeds, sugar, beef, pork, poultry, sheep and raw milk. Jongeneel et al. (2016) combined three agricultural supports and three trade options into nine agricultural policy and trade scenarios. The options of agricultural support considered in their study included: firstly, retention of 100 per cent of the current level of direct payments to UK famers; secondly, reduction of these payments from 100 per cent to 50 per cent; and thirdly, complete elimination of direct payments. The three trade scenarios in their study were (1) UK-EU FTA, (2) Default WTO, and (3) UK Trade Liberalisation. Table 4.2 summarises the combined agricultural policy and trade scenarios.

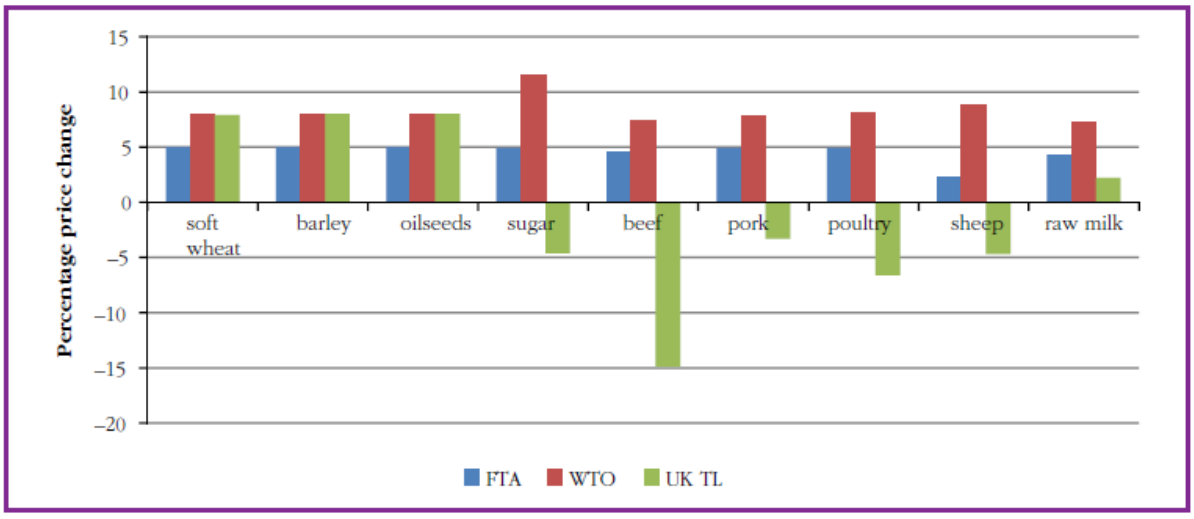
Table 4.2: Overview of trade scenarios.

	Agricultural policy scenario			
Trade policy scenario	**FTA between EU and UK (FTA)**	100% Direct Payment (DP); 5% trade facilitation costs (TFC)	50% DP; 5% TFC	No DP; 5% TFC
	Default WTO (WTO)	100% DP; 8% TFC	50% DP; 8% TFC	No DP; 8% TFC
	UK Trade Liberalisation (UK TL)	100% DP; 8% TFC	50% DP; 8% TFC	No DP; 8% TFC

Source: Jongeneel et al., (2016).

Under the FTA and Default WTO scenarios, results indicated that the average producer prices would increase 4.5 and 8.3 per cent, respectively (see Figure 4-1). Correspondingly, the UK's domestic production was projected to grow in the FTA and Default WTO scenarios. Due to the loss of the UK's access to EU preferential imports, producer prices for sheep meat, poultry meat, butter, cheese and sugar were projected to increase by 4.2, 0.3, 0.8, 0.3 and 3.8 per cent, respectively. Jongeneel et al. (2016) noted that the increased producer prices would be positive for the producers, however, in turn, this would have a negative impact on the UK's domestic consumers in the two scenarios.

Figure 4.1: Percentage price changes for selected crops and animal products.



Source: Jongeneel et al., (2016).

In addition, Jongeneel et al. (2016) showed that the UK Trade Liberalisation scenario was expected to have a significant negative impact on producer prices for all animal products (except for raw milk) and sugar. In particular, the beef price was projected to decline by 15 per cent. In contrast, producer prices were projected to increase for wheat, barley and oilseeds, as shown in Figure 4.1.

In a different study, Van Berkum et al. (2016) analysed the effects of Brexit on British agriculture at country/EU level and at farm-level using the AGMEMOD modelling approach. In their study, 12 commodities were selected and analysed; these were soft wheat, barley, rapeseed, sugar, beef, pork, poultry, sheepmeat, butter, cheese, skim milk powder and whole milk powder. The authors considered three trade policy scenarios in the event of a Brexit (see Table 4.3 for more detail): (1) UK-EU FTA scenario, (2) WTO-default scenario, and (3) UK trade liberalisation scenario.

Table 4.3: Overview of scenarios.

Name/label of scenarios	**Agricultural policy assumptions**		
	No changes in Rural Development	Policy plus …	
	100% Direct payments (DP)	50% DP	No DP
Baseline	Benchmark (existing CAP applies)	Not considered	Not considered
FTA between UK and EU	FTA+100%DP	FTA+50%DP	FTA+0%DP
WTO default position	WTO+100%DP	WTO+50%DP	WTO+0%DP
UK Trade Liberalisation	UK TL+100% DP	UK TL+50%DP	UK TL+0%DP

Source: Van Berkum et al. (2016).

Results showed that in the FTA scenario, prices for all selected agricultural products were projected to increase. Growth ranged from 2.3 per cent to 5.5 per cent. Correspondingly, these higher prices were projected to increase production of these agricultural products, as shown in Table 1.5 in the Appendix.

Similarly, in the WTO default scenario, prices for agricultural product were projected to increase (ranging from +7.2 to +11.5 per cent) (see Table 1.6 in the Appendix). Due to these price increases, production of most products was projected to grow, except for eggs and cheese production which were projected to decrease by 1.3 per cent and 0.2 per cent, respectively (Van Berkum et al., 2016).

In the UK Trade Liberalisation scenario the impacts on prices differ over the commodities, as shown in Table 1.7 in the Appendix. In general, the impact on crop prices (except for sugar) was small reflecting the fact that current EU prices are already similar to world prices. Sugar and animal products (meats and dairy products) still have a much higher degree of protection. Therefore, halving the import tariffs for these products would lead to significant price drops for these products, such as 18 and 19 per cent for beef and sheep meat, respectively.

In a follow-on study, Van Berkum et al. (2018) assessed the impacts of two Brexit scenarios on Dutch agricultural trade flows, using the AGMEMOD modelling approach. The scenarios were (1) EU – UK Free Trade Agreement, including 5 per cent trade transaction costs and (2) WTO default scenarios, the UK applies MFN tariffs, including 8 per cent trade transaction costs. Results from the EU – UK FTA scenario showed that Dutch exports to the UK and the rest of the world were projected to be affected only marginally. In contrast, the WTO scenario was projected to have a greater, but still relatively modest, impact on Dutch agricultural exports as a result of Dutch price competitiveness in the UK

market. Results further showed that the value of agricultural production in the Netherlands was projected to decline by around 2 per cent due to prices dropping (as a result of price pressure in the EU market as a consequence of Brexit-related trade distortions). The authors pointed out that potential impacts of non-tariff measures on trade costs were not included in the analysis.

In their study, Hubbard et al (2018) used a Computable General Equilibrium Model, a Partial Equilibrium Model and Farm Level Models to analyse the impact of various trade and domestic policy scenarios after Brexit on the UK economy, and particularly on its agricultural sector. Three scenarios were developed, (1) UK–EU Free Trade Agreement (FTA); (2) Unilateral Trade Liberalisation (UTL); and (3) return to WTO tariffs (EU Tariffs Schedule - WTO).

Results showed that Brexit was projected to have an overall negative impact on the UK Gross Domestic Product (GDP), however impacts were relatively small, as shown in Table 4.4. The largest impact was projected in the WTO scenario. Under the MFN tariff schedules UK GDP was projected to fall by 0.4 per cent per annum on average, whereas in the UTL scenario UK GDP was projected to fall the least, at 0.22 per cent per annum on average (Hubbard et al., 2018).

Table 4.4: CGE general effects on UK GDP, agri-food output and prices, percentage changes to baseline projections in 2026.

	Scenarios					
	FTA		UTL		WTO	
	+DP	-DP	+DP	-DP	+DP	-DP
UK GDP (%)	-0.34	-0.33	-0.22	-0.22	-0.42	-0.41
UK Production (%)						
Agriculture	0.4	-2.9	-0.9	-4.2	1.9	-1.1
Food	0.4	-0.6	2	0.9	0.8	0
-all meat (red and white)	2	-0.8	-11.8	-15	14.8	12.5
UK Prices (%)						
Agriculture (farm gate)	0.1	3.3	-0.5	2.6	2	5.5
-crops	0	2.6	0	2.3	1.2	4
-livestock	0.1	3.7	-0.8	2.8	2.5	6.4
Food retail prices	0.4	0.8	0	0.3	3.7	4.1
-all meat (red and white)	1.1	2	-4.3	-3.6	7.3	8.3

Note: DP= Direct Payment
Source: Hubbard et al., (2018).

In addition, in the WTO (+DP) scenario, UK farm gate prices for primary agriculture and retail prices for processed food were projected to increase. Compared to the baseline, prices in the meat sector and food processing were projected to increase by 7.3 per cent and 3.7 per cent, respectively. These price effects were consequences of the adjustment to WTO MFN tariffs on EU trade and the imposition of UK and EU trade transaction costs (4 per cent for crops and 8 per cent for livestock). The removal of

direct payments (WTO (-DP)) was projected to increase the equivalent per unit cost of agricultural production, resulting in further price increases (Hubbard et al., 2018).

In the UK-EU FTA scenario projected impacts on the UK agricultural sector were relatively modest. In contrast, in the UTL scenario significant negative impacts on prices, production and incomes were projected. The adoption of the EU's WTO tariffs on imports favours net importers (e.g. dairy) and negatively affects net exporters (e.g. sheep).

Hubbard et al. (2018) explain that given the strong dependence of most UK farms on direct payments, their removal worsens negative impacts of new trade arrangements and offsets positive impacts. These impacts vary across different types and farm sizes, but also regionally. However, the period of adjustment to new trade and domestic policy conditions may be very challenging for many farm businesses (Hubbard et al., 2018).

In their study, Sik Choi et al. (2019) examined the impacts of three different Brexit scenarios on the UK's agri-food sector using the agricultural sector model CAPRI. The three scenarios include increasing barriers to trade (1) EEA+, all tariffs on agricultural commodities removed, (2) EU-UK FTA including trade transaction costs, (3) WTO MFN tariff rates. Table 4.5 presents the three scenarios in more detail. Results were then compared to the baseline scenario in which the UK remains in the EU in 2030.

Table 4.5: Brexit Scenarios.

	Soft Brexit		**Hard Brexit (No deal)**
	EEA+	**FTA**	**WTO**
NTBs	5.0%	7.9-12.7%	12.6% (for primary products) 24.2% (for processed products)
Tariff (UK-EU27)	No tariffs	No tariffs	MFN tariffs
UK's EU budget (CAP) contribution	Yes	No tariffs	No
TRQs	historical level TRQs remain in the UK		
UK's trade with the ROW	UK retains EU's FTAs with third countries		

Note: NTB costs are shown in ad-valorem equivalent tariff rates.
Source: Sik Choi et al., (2019).

Overall, results showed that Brexit has a much larger impact on trade patterns in the UK compared to the EU27. Even in the EEA+ scenario, UK exports were projected to drop by between 10 -25 per cent for all commodities due to the additional 5 per cent trade transaction costs. In the WTO scenario, cereals, meat and dairy exports were projected to fall by more than 60 per cent. In addition, imports to the UK were projected to drop in all product categories except for oilseeds (Sik Choi et al., 2019).

Results further showed that UK producer prices for the majority of commodities were projected to increase; this was due to a drop in imports to the UK. In the EEA+ and FTA scenarios, projections of producer price changes were rather small (less than 5 per cent) for all commodities. The highest impacts were projected in the WTO scenario, where producer prices of meat and dairy products were projected to rise by 12 per cent and 7.5 per cent, respectively (Sik Choi et al., 2019).

In terms of welfare impacts from the three scenarios, Sik Choi et al. (2019) showed that in all scenarios, UK consumers (-12 to -125 €/capita) and producers in EU27 (income losses, -0.2 to -2.5 per cent) were affected. However, the authors pointed out that if trade costs were kept low, the termination of the contribution to the EU CAP and the gains to producers from higher food prices could offset the losses to consumers. In the EU, falling food prices would benefit consumers but would reduce farmers' incomes (Sik Choi et al., 2019).

In a recent study conducted by The Andersons Centre (2019), the impacts of two different Brexit scenarios on British beef and sheepmeat trade and the supply chain were examined. The scenarios were Brexit Deal (i.e. EU-UK FTA) and No Deal (WTO Default position). Results showed that under the Brexit Deal scenario the impact on trade was projected to be relatively small with slight decreases projected for beef and sheepmeat exports (1.1 per cent) from the UK to the EU27 due to non-tariff measures (see Appendix Table 1.8). In contrast, under the No Deal scenario projections indicated significant drops in beef and sheepmeat trade between the UK and the EU27 due to the imposition of tariffs, TRQs and a higher incidence of NTMs (see Appendix Table 1.9). Combined beef and sheepmeat exports to the EU were projected to fall by 92.5 per cent, with sheepmeat exports projected to be almost completely wiped out.

Results on the impact on prices to 2022 showed small decreases in the Brexit Deal scenario (-1 to -3 per cent, respectively) while in the No Deal scenario sheepmeat prices were projected to drop by 24 per cent and beef by 4 per cent. Combining the price and quantity effects, the overall impact on the value of domestically produced carcass meat output under a Brexit Deal was projected to fall by 1.7 per cent while under the No Deal scenario the decline would increase by nearly ten-fold (-11.7 per cent) with sheepmeat output almost 31 per cent lower. (The Andersons Centre, 2019).

In his study, Revell (2017) focussed on the issues surrounding EU28 Tariff Rate Quotas (TRQs) relating to the trade of livestock products between the UK and the EU post-Brexit. The author assumed that the EU and the UK would adopt their trade commitments through the WTO, which means the UK and the EU would have to set their own schedule of TRQs at the WTO. Hence, both the UK and EU would need to make a decision on splitting the current TRQs between them in case of Brexit. This would involve negotiating trade agreements not only between the remaining EU countries and the UK, but also with third country exporters regarding market access.

Revell (2017) emphasised that the TRQs play a key role for the management and control of external competition in the EU28's agri-food sector. These TRQs enable the EU to export agricultural products at reduced tariffs up to certain amounts. Currently, the EU has about 87 TRQs schemes for agricultural, food and beverage products, including dairy, beef, lamb, poultry meat, sugar, fruit and vegetables, compared to the 54 maintained by the US and 12 by Canada. These TRQs accounted 6 per cent of the EU's agri-food imports in 2014 (Potton and Webb, 2017).

Revell (2017) noted that there are numerous TRQ schemes for meat products, especially for beef and veal. The sheep and goat meat TRQ is simple when compared to the beef and veal. The TRQ for sheep and goat meat is almost 287,000 tonnes, with country-specific allocations, primarily for NZ (228,200 tonnes), followed by Argentina and Australia. Nine TRQs are applied on chicken and turkey. In terms of the dairy sector, the EU has separate TRQs for specific types of cheese, with a total amount of 117,670 tonnes. In case of Brexit, Revell (2017) explained that a simple partitioning of existing TRQs

between the EU-27 and the UK is unlikely to resolve the complex issue of access rights of third countries to both markets. He further noted that there is a potential need for reciprocal EU27 – UK TRQs after Brexit. He further suggested that the UK should negotiate its own TRQs with third countries in the long run.

To conclude, a few studies have assessed the potential impact of the UK leaving the EU on the agricultural sector and trade using different scenarios and assumptions. These scenarios include FTA, WTO MFN tariffs, additional NTM at various ranges (trade transaction costs etc.) and UTL (Unilateral Trade Liberalisation). The literature showed mixed results from these studies/ scenarios depending on the assumptions. While some studies projected a positive impact on the UK agricultural sector with increased producer prices across the agricultural commodities (Davis et al, 2017; Jongeneel et al., 2016; Van Berkum, 2016; Sik Choi et al., 2019), other studies projected price drops, especially for the beef and sheepmeat sector (The Andersons Centre, 2019; Davis et al., 2017). In contrast, a Unilateral Trade scenario (i.e. all UK import tariffs drop) showed significant negative impacts on prices, production and incomes across the UK agricultural sector (Jongeneel et al., 2016; Hubbard et al., 2018). Further, these studies have shown a decrease in bilateral agricultural trade between the UK and the EU with larger impacts on trade patterns in the UK compared to the EU27 but also affecting other EU member states, particularly Ireland (Bellora et al., 2017). In addition, the majority of studies/ scenarios showed a negative impact on UK's domestic consumption facing higher food prices.

Chapter 5
Summary

This report reviewed existing literature of potential impacts of different scenarios of the United Kingdom (UK) leaving the European Union (EU) on 31st of October 2019. Several studies have assessed the potential effects of the UK exiting the EU on the UK agricultural sector using various scenarios and assumptions around different types of potential trade agreements between the EU and the UK.

Three possible alternatives to EU membership after Brexit are widely cited. These are (1) the Norwegian Option, i.e. admission to the European Economic Area (EEA); (2) the Swiss Option, i.e. bilateral agreements with the EU; (3) the WTO/ No Deal Option where the UK's trade relations with the EU would be organised according to the Most-Favoured-Nation (MFN) principle, which applies for all third countries where the EU does not have a preferential trade agreement. All of these options include new trade tariffs combined with changes in trade transaction costs as non-tariff barriers (with various ranges).

A large number of studies have been conducted to estimate the economic impact of the UK leaving the EU on the UK's economy. The majority of these projected a negative impact on the UK's economy from Brexit with a projected reduction of GDP and loss in household income to varying degrees depending on the scenario assumptions and the type of trade agreement met with the EU (HM Treasury, 2016: PWC, 2016; Dhingra et al., 2017; Booth et al., 2015; Boulanger & Philippidis, 2015); Mion & Ponattu, 2019). The studies further showed that these welfare impacts vary regionally with welfare losses predicted to be stronger the closer a country is to the UK (Mion & Ponattu, 2019).

At industry level, a few studies have assessed the potential effects of the UK exiting the EU on the UK agricultural sector. Results from these studies were mixed depending on the scenarios examined. While some studies projected a positive impact on the UK agricultural sector with increased producer prices across the agricultural commodities (Davis et al, 2017; Jongeneel et al., 2016; Van Berkum, 2016; Sik Choi et al., 2019), other studies projected price drops especially for the beef and sheepmeat sector (The Andersons Centre, 2019; Davis et al., 2017). In contrast, a Unilateral Trade scenario (i.e. all UK import tariffs drop) showed a significant negative impact on prices, production and incomes across the agricultural sector (Jongeneel et al., 2016; Hubbard et al., 2018). Further, these studies have shown a decrease in bilateral agricultural trade between the UK and the EU with larger impacts on trade patterns in the UK compared to the EU27 but also affecting other EU member states, particularly Ireland (Bellora et al., 2017). In addition, the majority of studies and scenarios predicted a negative impact on the UK's domestic consumption facing higher food prices.

To conclude, the UK's exit from the EU will have a range of implications for these two regions and other countries worldwide. The nature and extent of its impacts will be determined by the terms under which the UK exits, hence the impact of Brexit is yet unknown. The limitation of trade with the EU due to higher trade barriers will likely benefit UK producers in the agricultural sector, however these benefits will come at a cost to consumers as they will face higher prices and rising food budgets. Conversely unilateral trade liberalisation would benefit consumers while reducing producer returns. The exact impacts on agricultural will be contingent on the setting of the agricultural policy in place of CAP in the UK.

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Appendix: Literature Review -Result Tables

Table 1.1: MFN Tariffs implemented in WTO default scenario, (Davis et al., 2017).

Products	MFN Tariff
Beef Carcass	12.8% plus €176.89/100 kg
Sheep Carcass	12.8% plus €171.3/100 kg
Pig Carcasses	€53.6/100kg
Chicken Carcasses	€32.5/100kg
Cheese (Cheddar)	€167.1/100kg
Butter	€189.6/100kg
Wheat	€95/100kg
Barley	€93/100kg

Table 1.2: Projected changes in the livestock sectors in the UK, percentage difference in 2025 by scenario (Davis et al., 2017).

	Bespoke UK-EU FTA	WTO Default	Unilateral Trade Liberalisation
Cattle	1%	18%	-42%
Beef cows	0%	6%	-2%
Dairy cows	0%	10%	-14%
Total Cattle	0%	11%	-17%
Beef			
Production	0%	10%	-10%
Domestic use	-1%	-3%	18%
Export	-2%	-100%	-100%
Exports from UK to EU27	-2%	-100%	-100%
Exports from UK to non-EU	-2%	-100%	-100%
Import	-3%	-70%	38%
Imports from EU27 to UK	-3%	-92%	-100%
Imports from non-EU to UK	-3%	94%	1103%
Cattle price	3%	17%	-45%
Sheep			
Ewes	0%	-13%	-12%
Total Sheep	0%	9%	16%
Sheep meat	0%	-73%	-86%
Production	-1%	-83%	-84%
Domestic use	0%	9%	16%
Exports	0%	-73%	-86%
Exports from UK to EU27	-1%	-83%	-84%
Exports from UK to non-EU	0%	-23%	-100%
Import	0%	-17%	-15%
Imports from EU27 to UK	-1%	-100%	-100%
Import from non-EU to UK	0%	-7%	-5%
Sheep meat price	-1%	-30%	-29%
Pig			
Sows	1%	21%	-8%
Total pigs	1%	23%	-8%
Pig meat			
Production	1%	22%	-6%
Domestic use	0%	-6%	5%
Export	0%	-100%	-100%
Exports from UK to EU27	-1%	-100%	-100%
Exports from UK to non-EU	0%	-100%	-100%
Import	-1%	-56%	-9%

Imports from EU27 to UK	-1%	-57%	-31%
Imports from non-EU to UK	0%	0%	7811%
Pig meat reference price	0%	18%	-12%
Poultry			
Production	0%	11%	-3%
Domestic use	0%	-2%	1%
Export	-2%	0%	-43%
Exports from UK to EU27	-2%	-100%	-100%
Exports from UK to Non-EU	0%	408%	189%
Import	-1%	-40%	-8%
Imports from EU27 to UK	-1%	-81%	-100%
Imports from Non-EU to UK	0%	686%	1603%
Chicken price	0%	15%	-9%

Table 1.3: Projected changes in the Dairy sectors in the UK, percentage difference in 2025 by scenario compared to the baseline (Davis et al., 2017).

	Bespoke UK-EU FTA	WTO Default	Unilateral Trade Liberalisation
Dairy			
Cow's milk production	0%	7%	-2%
Liquid consumption	0%	-3%	1%
Manufacturing use	1%	18%	-6%
Prices			
Producer milk price	1%	30%	-10%
Cheese price	1%	29%	-11%
Butter price	0%	43%	-11%
WMP price	0%	0%	0%
SMP price	0%	0%	0%
Cheese			
Production	1%	19%	-4%
Domestic use	0%	-4%	2%
Export	-2%	-100%	-88%
Exports from UK to EU27	-3%	-100%	-27%
Exports from UK to Non-EU	0%	-100%	-100%
Import	-2%	-54%	0%
Imports from EU27 to UK	-2%	-55%	-28%
Imports from Non-EU to UK	-13%	-23%	380%
Butter			
Production	0%	25%	-2%
Domestic use	0%	-11%	4%
Export	-4%	-100%	-100%
Export from UK to EU27	-5%	-100%	-100%
Exports from UK to Non-EU	1%	-100%	-100%
Import	-2%	-97%	-26%
Import from EU27 to UK	-2%	-100%	-100%
Imports from Non-EU to UK	-1%	-7%	2558%

Table 1.4: Projected changes in the crop sector sectors in the UK, percentage difference in 2025 by scenario compared to the baseline (Davis et al., 2017).

	Bespoke UK-EU FTA	WTO Default	Unilateral Trade Liberalisation
Wheat			
Production	0%	-1%	-1%
Domestic use	0%	6%	-2%
Export	-3%	-77%	-34%
Export from UK to EU27	-4%	-100%	-100%
Exports from UK to Non-EU	-1%	-25%	166%
Import	-1%	-66%	-62%
Import from EU27 to UK	-1%	-93%	-96%
Imports from Non-EU to UK	-1%	-20%	-6%
Barley			
Production	0%	-1%	-2%
Domestic use	0%	7%	-2%
Export	-3%	-42%	-8%
Exports from UK to EU27	-5%	-78%	-78%
Exports from UK to Non-EU	0%	12%	97%
Import	-3%	-100%	-100%
Imports from EU-27 to UK	-3%	-100%	-100%
Imports from Non-EU to UK	-2%	-100%	-100%
Area			
Wheat	0%	-1%	-1%
Barley	0%	-1%	-1%
Prices			
Wheat	-1%	-4%	-5%
Barley	-1%	-5%	-7%

Table 1.5: Percentage difference in price, production, consumption and trade in Scenario 1 (FTA, 5% trade facilitation costs and a 3% negative price wedge for sheep meat) a) compared to the baseline scenario, 2025 (Van Berkum et al., 2016).

	Soft wheat	Barley	Rapeseeds	Sugar	Beef	Pork	Poultry	Eggs	Sheep	Raw milk	Butter	Cheese	SMP	WMP
Price	5.0	5.0	5.0	4.9	4.6	4.9	4.9	4.5	2.3	4.3	5.0	5.0	4.9	5.5
Production	1.2	1.2	0.1	1.1	1.1	0.7	1.5	-0.8	1.1	1.1	0.1	0.1	18.9	7.8
Use	1.2	0.4	1.8	0.0	-0.1	-0.4	0.0	0.0	2.2		-0.2	-1.1	0.0	0.0
Net exports b)		9.5	-7.4						-48.7				1333.0	
Net imports b)	1.6			-0.6	-17.9	-2.1	-18.2	0.4			-0.6	-2.5		-62.3

Table 1.6: Percentage difference in price, production, consumption and trade in Scenario 2 (WTO default, 8% trade facilitation costs, UK loses access to the EU's preferential import regimes) compared to the baseline scenario, 2025 (Van Berkum et al., 2016).

	Soft wheat	Barley	Rapeseeds	Sugar	Beef	Pork	Poultry	Eggs	Sheep	Raw milk	Butter	Cheese	SMP	WMP
Price	8.0	8.0	8.0	11.5	7.4	7.8	8.1	7.1	8.8	7.2	8.8	8.3	7.8	9.3
Production	2.0	2.0	0.2	2.9	1.5	1.2	2.5	-1.3	6.8	2.0	0.4	-0.2	32.5	13.5
Use	2.1	0.6	2.9	-0.1	-0.1	-0.6	0.2	0.0	-0.8		-0.4	-1.9	0.0	0.0
Net exports a)		16.6	-12.4						326.0				2285.0	
Net imports a)	2.4			-1.5	-26.4	-3.5	-28.9	0.6			-1.4	-4.1		-107.0

Table 1.7: The impact of a UK Trade Liberalisation scenario (50% border tariff reduction and 8% trade facilitation costs), in percentage difference in price, production, consumption and trade compared to the baseline scenario, 2025, (Van Berkum et al., 2016).

	Soft wheat	Barley	Rapeseeds	Sugar	Beef	Pork	Poultry	Eggs	Sheep	Raw milk	Butter	Cheese	SMP	WMP
Price	7.9	8.0	8.0	-4.6	-14.9	-3.3	-6.6	8.7	-4.7	2.2	-0.6	3.9	8.0	3.8
Production	1.3	1.3	0.5	-1.9	-6.6	-1.9	-2.5	-1.2	-6.6	-0.7	-1.9	0.5	-2.6	-1.7
Use	-2.3	0.4	2.9	0.0	0.6	-1.7	0.1	0.0	-1.8		0.1	-0.9	0.0	0.0
Net exports a)		10.8	-10.0						-206.0				-181.0	
Net imports a)	-17.2			1.0	106.0	-1.3	29.0	0.5			2.2	-2.7		13.5

Table 1.8: Projected Impacts on Beef and Sheepmeat Offal under Brexit Deal (The Andersons Centre, 2019).

	Beef Offal			**Sheepmeat Offal**			**Total Offal**		
Measure	*Base*	*Deal*	*% ch*	*Base*	*Deal*	*% ch*	*Base*	*Deal*	*% ch*
UK Production	54.9	55.0	0.2	19.0	18.9	-1.0	73.9	73.8	**-0.1**
Exports	43.1	43.1	-0.1	6.1	6.1	-0.5	49.3	49.3	**-0.1**
To EU	21.2	21.0	-0.8	3.5	3.5	-0.8	24.8	24.6	-0.8
To Non-EU	21.9	22.1	0.7	2.6	2.6	0.9	24.5	24.7	0.7
Imports	11.8	11.8	-0.2	7.9	7.9	0.0	19.8	19.8	**-0.1**
EU	11.8	11.8	-0.2	1.0	1.0	-0.2	12.8	12.8	-0.2
Non-EU	0.1	0.1	0.0	6.9	6.9	0.0	7.0	7.0	0.0
Estimated Consumption	23.6	23.6	0.5	20.8	20.6	-0.9	44.4	44.3	**-0.2**

Table 1.9: Projected No Deal Impacts on Beef and Sheepmeat Offal ('000 Tones) (The Andersons Centre, 2019).

	Beef Offal			Sheepmeat Offal			Total Offal		
Measure	*Base*	*Deal*	*% ch*	*Base*	*Deal*	*% ch*	*Base*	*Deal*	*% ch*
UK Production	54.9	54.9	0.0	19.0	17.3	-9.0	73.9	72.2	-2.3
Exports	43.1	43.5	0.9	6.1	6.2	-0.2	49.3	49.7	0.8
To EU	21.2	19.8	-6.5	3.5	3.6	-0.3	24.8	23.4	-5.6
To Non-EU	21.9	23.7	8.1	2.6	2.6	5.1	24.5	27.3	7.2
Imports	11.8	9.0	-24.2	7.9	7.9	-0.3	19.8	16.9	-14.6
EU	11.8	8.8	-25.0	1.0	1.0	-2.6	12.8	9.8	-23.3
Non-EU	0.1	0.1	166.6	6.9	6.9	0.0	7.0	7.1	1.3
Estimated Consumption	23.6	20.3	-13.8	20.8	19.1	-8.3	44.4	39.4	-11.2